# PRESERVATION AND RESTORATION OF LIBRARY COLLECTIONS FROM FIRE

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## ABSTRACT

*One of the roles of library managers is to preserve and protect the library's collection from natural and unnatural disasters. Statistics are presented to illustrate recent library fires in the United States, followed by a description of early fire tests for libraries which provided library managers with a knowledge base for fire protection decisions for their collections. A discussion of fire protection for collections housed in compact mobile shelving is included as well as protecting rare book collections. The final discussion addresses creating evacuation and salvage plans.*

## INTRODUCTION

From the beginning of recorded history library collections have been subject to fires, either accidental or intentional. Sprinklers were introduced in the 1960s and installed in some large public and university libraries. Rare book collections require a somewhat different approach to fire protection because of water damage. Compact mobile shelving may present other fire protection challenges.

## LIBRARY STATISTICS

The earliest recorded large library fire (over 700,000 works) can be traced to Alexandria, Egypt (48 B.C.). Large loss fires are still experienced; for example the $8 million Los Angeles Central Library fire, 29 April 1986.[1] These large loss fires gained a lot of media attention. However, there are many more smaller, less publicized library fires. A look at the U.S. Fire Administration statistics on recent library fires in the United States provide an understanding of the current situation.[2]

Table 1. Fires in United States Libraries, 1991-1995.

| Year | Total Number of Fires | Sprinklers Not Present | Sprinklers Present | Estimated Loss (U.S. $1000) |
|---|---|---|---|---|
| 1991 | 91 | 46 | 45 | 68 |
| 1992 | 80 | 43 | 37 | 1,300 |
| 1993 | 65 | 33 | 32 | 1,400 |
| 1994 | 69 | 34 | 35 | 97 |
| 1995 | 66 | 35 | 31 | 658 |

The number of library fires has decreased from 19[illegible] through 1995. Using NFIRS (National Fire Incident Reporting System) data, John Hall est[illegible]nated a 61 percent reduction in the average loss per fire due to automatic suppression equipment over this period for stand-alone libraries and from one-half to two-thirds reduction for all other libraries when automatic suppression equipment was present.[3]

## LIBRARY FIRE TESTS

Is fire still a threat to libraries? The answer is "yes." One means to respond to the fire threat in libraries is to install automatic sprinkler systems. Thus, their effectiveness is an important consideration. One of the first documented fire tests of effectiveness of sprinklers in libraries was done for the New York City Public Library after two large library fires raised concern amongst insurance companies.[4] In 1950 the Factory Mutual Insurance Corporation in Norwood, MA, conducted two library fire tests. The assembly was built with four tiers of open shelves, nine meters high, and loaded with books. The first fire test was conducted with sprinklers. It took three minutes and 43 seconds for the first sprinkler to activate and another four minutes, 48 seconds before the fire was under control by a total of two sprinklers operating. A total of 350 liters of water were used. For comparison, a second fire test was conducted without sprinklers. It took nine minutes for the fire to reach the fourth tier, 7.3 meters above the floor. It took firefighters a total of 20 minutes and 10,600 liters of water to bring the fire under control and it smoldered for hours. Librarians who saw the tests were not convinced of the overall effectiveness of sprinklers because of the water damage to the books and non-print materials. They had the American Library Association (ALA) study the problem further. In 1963 ALA made their recommendations available but there was no endorsement for automatic sprinklers; the report "... was a good guide to various aspects of construction and other forms of protection for libraries."[5]

## UNIQUE LIBRARY COLLECTION PROBLEMS

Over the past few decades new fire protection challenges have emerged. These include the use of compact mobile shelving and the conflict between ceiling height and sprinkler spacing. In addition, another major challenge is how to best protect rare book collections.

An example of the National Archives/Library of Canada's situation is instructive. A new sprinkler system installation was planned to protect compact mobile shelving located three levels below ground. The challenge was to provide an acceptable level of safety without losing any shelving space due to an existing low ceiling. Lougheed et al.[6] stated that the recommended distance from the top of the sprinkler deflector to the top of the storage is 457 mm; the library had only 178 mm. Losing a lot of storage space was an option, albeit an unacceptable one. It was agreed that a series of fire tests would be conducted to determine how to achieve an acceptable level of fire safety and minimum loss of storage capacity. By instituting the recommendations (vertical fire barriers, a minimum of 26 mm clearance between storage containers, no newspapers stored in open document boxes), the library was able to satisfy their fire safety objectives using horizontal sidewall sprinklers with a high spray density. The fire safety goals were able to be met without changing the 178 mm clearance from the top of the document boxes to the ceiling.

Water typically is not used for protection of rare book collections. Stains from water striking centuries-old vellum or parchment may not be easy to remove. Bindings deteriorate from

water damage too. Delicate inks in many colors may be damaged by water and not possible to restore. For a while it appeared that Halon 1301, a gaseous agent, was the fire suppression agent of choice. However, with advanced scientific evidence that halon was environmentally damaging, many people are asking whether or not existing halon systems should be removed. The Artim[7] and Roberts[8] articles provide some practical suggestions, as well as insight into the economics, of converting from a Halon 1301 system to one of the new environmentally friendly fire suppression systems.

## PLANNING FOR EVACUATION AND SALVAGE

Preplanning to ensure safe evacuation of the patrons and staff in the library is essential. Guidelines outlined in the National Fire Protection Association's NFPA 910[9] and unpublished library plans are informative. The librarian and/or the library committee working with the fire department can draw up evacuation plans for their specific environment. After the evacuation procedure has been reviewed, and approval given by the fire department, the task of evaluating the books, journals, reports., etc. to be salvaged from water and/or fire damage should be made by designated library staff to expedite the salvage process and recover as much as possible.

## EVACUATION PLANS

The following examples are extracted from NFPA 910, World Wide Web sites, and the unpublished library plans.

The size and complexity of the library spaces are important considerations in developing a plan. A one room library with one staff person, no automatic sprinkler system, two exits, and no alarm system will have a simple plan. It may resemble the following:

- Call the fire department (e.g., 911);
- make a voice announcement to evacuate the building;
- check the stack area(s) for patrons;
- close the library door after the last person;
- notify other building occupants if the fire department has not yet arrived.

If the library has multiple floors in one or more buildings, it is necessary to develop a detailed plan. The University of California, Berkeley has a very detailed plan available on the World Wide Web.[10] A committee composed of the representatives from the library staff, security, and the Berkeley facilities group provided good university representation to the committee developing guidelines. As the libraries are staffed solely by student assistants in the evenings and weekends, there is a greater need for detail due to the ephemeral nature of student employment. A yearly fire drill as part of the evacuation plan is a good way to review the feasibility of the evacuation plan.

It would be excellent if all libraries conducted fire drills, but the amount of preplanning with the local fire department and library staff, and the cost thereof is often a deterrent. Conversely, the fire department may provide onsite training for the staff, e.g., how to use water fire extinguishers, Class ABC fire extinguishers.

As noted above, the following examples are extracted from NFPA 910, World Wide Web sites, and unpublished library plans.

A. If the alarm goes off in the building:

- identify the exit(s) the staff and patrons should use;
- make the announcement to evacuate;
- leave all equipment "as is";
- do not re-enter the building until approval has been given to do so by the fire department.

B. If the alarm goes off in another building:

- do not give the announcement to evacuate;
- send staff to pre-determined points of control;
- follow instructions of fire department personnel.

Other management decisions to be made may be how to secure the Rare Books Room. If there is a rare books room, should this area be on the same key as the rest of the library? For security purposes should this room have its own fire suppression system? If not, what will the library policy state in the event of a fire? The more guidelines that can be provided, the easier it will be for the staff to perform their tasks during an emergency. Staff should review the plans periodically to ensure ease of usage and understanding of individual responsibilities.

## SALVAGE PLANS

A potential scenario is a small fire in one of the stacks. One sprinkler head extinguished the fire within five minutes; that is, the fire department was alerted but when they arrived the fire was extinguished. What is the damage? What are the guidelines for establishing the priorities of what will be salvaged? Newer technologies have been useful preserving documents from water damage. For example, freeze drying was first used in the Temple University Library fire as a way of salvaging water-damaged collections.[11] Some items to consider: preserving the bibliographic records of the collection (e.g., shelf list, card catalog, magnetic tapes); what are the priority items in the collection; items that should not be frozen (e.g., microforms, photographs); items that should not be air-dried (glossy, coated paper or water soluble inks). The priority items should be marked on the library floor plan to assist the workers performing the salvage. In the above scenario only one section was affected, so the conclusion could be to air dry the books.

The National Archives/Records Administration (NARA) offers salvage and recovery training to libraries throughout the United States. In 1996 the National Institute of Standards and Technology (NIST) archivist hosted the training class and arranged for live fire tests in the Large Fire Test Facility. After the fire was extinguished the participants performed a variety of tasks.

- They prioritized what items were to be freeze-dried;
- they prepared items for air drying;
- they processed book and non-book materials.

Other libraries run similar programs with or without the support of NARA. One example is the San Diego/Imperial County Libraries Disaster Response Network (SILDRN) two day seminar entitled: In an Emergency: Library Collections Salvage. In their scenario there was an earthquake and a resultant fire. They also have an extensive resource list which is available to the libraries throughout the library system.

Some salvage procedures noted in NFPA 910[12] are:

- Turn off heat and create free circulation of air;
- keep fans and air conditioning on at night (except when a fungicidal fogging operation is in progress);
- no restoration on site;
- clean gently with cold running water and dab with cellulose sponge;
- do not remove all mud by sponging;
- do not remove covers from books;
- do not use colored paper for interleaving in the drying process;
- do not pack newly dried materials in boxes and ignore for several days.

Each library may wish to draw upon the planning and experience of others to create a salvage policy. The exercise of identifying key resources in an area is invaluable. The local fire department or commercial establishments also may be able to provide leads to experts and equipment to use during salvage.

## CONCLUSIONS

Fires present a challenge in protecting library collections. Statistical data indicates that there is a reduction in damage when automatic sprinkler systems are present, as well as the potential of reclaiming the collection after being protected by water. Evacuation plans, plans to restore the collection after a fire, salvage plans, names and addresses of experts and companies to perform the salvage are primary tools needed by the library in the event of a fire. It is to this end that we will be able to better protect library collections.

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The Fire Research Information Services (FRIS) is the only fire research information center in the United States. In 1971 Ms. Jason joined the National Bureau of Standards (currently the National Institute of Standards and Technology) to build a fire safety database for the National Aeronautics and Space Administration, Aerospace Safety Research and Data Institute (ASRDI). The database is now part of NASA RECON (their bibliographic database). The NASA work stimulated the beginning of FRIS and the building of the fire research collection. The collection has grown from zero to over 60,000 items during this time period. Access to the collection has been automated and national and international users can access the database, FIREDOC, from their home or office via modem, Internet, or World Wide Web. FIREDOC contains the bibliographic references, keywords, identifiers and (where possible) abstracts to the items in the collection. Under her guidance the first fire CD-ROM in the world was created, ***Fire Research Publications, 1993***, replaced by the ***BFRL Publications*** series, which is in its 4th edition.

After receiving her Master of Library of Science degree from the State University of New York at Albany, Ms. Jason accepted a position as cataloger, Sacramento Sate College, California. From 1967-1970 she was an Administrative Librarian, Stuttgart and Head Librarian, Munich, Germany, Special Services Libraries respectively. Upon the completion of a three-year contract she returned to the United States to accept the position in FRIS.

Ms. Jason has established national and international document exchange programs with her counterparts. As one of the driving forces of inFIRE (international network of Fire Information and Reference Exchange), she has been instrumental in developing products, e.g., a Union List of Serials, for use by the fire information community. Special projects also have been done for government agencies; for example, NASA, Minerals Management Service. Ms. Jason was an observer at the Federal Pre-White House Conference on Libraries and Information Services held at the National Library of Medicine in 1990 and the White House Conference on Libraries and Information Service, 1991. She was awarded the Society of Fire Protection Engineers Director's Award for the 1992 Outstanding Committee Chair, as the Chair of the inFIRE Advisory Committee. She is a member of the Special Libraries Association, inFIRE, and the Textile Information Users Council.